OIPE
OCT 24 2005
PATENT & TRADEMARK OFFICE

AF IFW

TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No. K-2026

In Re Application Of: **THOMAS J. LONG, II et al.**

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/673,306	September 29, 2003	Willmon Fridie Jr.	27877	3722	1515

Invention: **ROTARY CUTTING TOOL HAVING IRREGULAR INSERT ORIENTATION**

COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on

The fee for filing this Appeal Brief is: **$500.00**

☐ A check in the amount of the fee is enclosed.

☒ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **502867** including any required petition for extension of time for filing this Brief and fees therefor.

☐ Payment by credit card. Form PTO-2038 is attached.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

Signature

Dated: **October 21, 2005**

Larry R. Meenan
Reg. No. 33,423
Kennametal Inc.
1600 Technology Way
P. O. Box 231
Latrobe, PA 15650-0231
Phone: 724-539-5485
Fax: 724-539-5903

cc:

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on

October 21, 2005
(Date)

Signature of Person Mailing Correspondence

Larry R. Meenan

Typed or Printed Name of Person Mailing Correspondence

Practitioner's Docket No. K-2026 ***PATENT***

CERTIFICATION UNDER 37 C.F.R. sections 1.8(a) and 1.10

I hereby certify that, on the date shown below, this correspondence is being:

☒ deposited with the United States Postal Service in an envelope addressed to the Mail Stop Appeal Brief-Patents, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450.

37 C.F.R. section 1.8(a)	**37 C.F.R. section 1.10**
☒ with sufficient postage as first class mail.	☐ as "Express Mail Post Office to Address" Mailing Label No. _____

☐ transmitted by facsimile to the Patent and Trademark Office 571-273-8300.

Date: October 21, 2005

Larry R. Meenan

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
Thomas J. Long II et al.	)	Group Art Unit 3722
	)	Confirmation No. 1515
Serial No. 10/673,306	)	
	)	Examiner Willmon Fridie Jr.
Filed: September 29, 2003	)	
	)	
For: ROTARY CUTTING TOOL HAVING IRREGULAR INSERT ORIENTATION	)	Attorney Docket K-2026

October 21, 2005

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

ATTENTION: Board of Patent Appeals and Interferences

APPELLANT'S BRIEF (37 C.F.R. § 1.192)

This Bef is in furtherance of the Notice of Appeal, filed in this case on September 6, 2005.

The fees required under § 1.17, and any required petition for extension of time for filing this Brief and fees therefor, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief is transmitted in triplicate. (37 C.F.R. § 1.192(a)).

This brief contains these items under the following headings, and in the order set forth below (37 C.F.R. § 1.192(c)):

The final page of this brief bears the practitioner's signature.

I REAL PARTIES IN INTEREST (37 C.F.R. § 1.192(c)(1))

The real party in interest in this appeal is the following party: Kennametal Inc., by assignment dated September 29, 2003.

II RELATED APPEALS AND INTERFERENCES (37 C.F.R. § 1.192(c)(2))

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending Appeal, there are no such appeals or interferences.

III STATUS OF CLAIMS (37 C.F.R. § 1.192(c)(3))

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are: 20

B. STATUS OF ALL THE CLAIMS IN APPLICATION

1. Claims canceled: None
2. Claims withdrawn from consideration but not canceled: None
3. Claims pending: 1 - 10
4. Claims allowed: None
5. Claims rejected: 1 - 10

C. CLAIMS ON APPEAL

The claims on appeal are: 1 - 20

IV STATUS OF AMENDMENTS (37 C.F.R. § 1.192(c)(4))

No Amendment was filed after final rejection.

An Amendment was filed on December 16, 2004, amending claims 1 – 10 and adding new claims 11 – 20. In a Final Office Action dated March 9, 2005, only claims 1 – 10 were finally rejected. New claims 11 – 20 were not rejected or addressed in the Final Office Action, but nonetheless for sake of completeness, Applicants have included claims 11 – 20 in this Appeal.

Claims 1 – 20 as presented in the Amendment are included in this Appeal.

V SUMMARY OF INVENTION (37 C.F.R. § 1.192(c)(5))

Machining work pieces by rotary cutting tools may cause objectionable vibrational harmonics to occur. This results in chatter and other phenomena which may cause flaws in the machined product. It is not desirable to alter rotational speeds of a machine tool and rate of advance speeds of a cutting tool as such steps may interfere with optimal productivity.

Various methods and cutting insert arrangements have been proposed to address the issue of objectionable vibrational harmonics. For example, it is known to vary circumferential spacing of inserts and their pockets in a rotary cutting tool to break up harmonics which might otherwise occur. It is also known to vary rake angles among inserts.

The present invention is directed to a helical end mill 10. The helical end mill 10 includes a body 12 having a circumferential face 14 bearing a plurality of pockets 16 for receiving cutting inserts 2. The pockets 16 are arranged in rows, which appear horizontally arrayed when the rotational axis 20 of the end mill 10 is vertical (Fig. 1). The columns include all pockets 16 of any one of flutes 24, 26 or 28, for example. The cutting inserts 2 are arranged in at least two rows and at least three columns (e.g. 24, 26 and 28) on the circumferential face 14 such that the angular spacing of the cutting inserts 2 within at least one of the rows varies within the row. The angular spacing of the cutting inserts 2 on the helical end mill 10 is varied to avoid repetitive orientation which may promote vibrational harmonics during operation.

Further clarification of the present invention may be found by reference to Fig. 1. As shown in Fig.1, there are three helical flutes 24, 26, or 28. In the first row, that being at the bottom of tool 10 as depicted in Fig. 1, flutes 24, 26, and 28 are spaced at intervals of 119 degrees, 120 degrees, and 121 degrees about the periphery of tool 10, as viewed in end elevation (for example, see Fig. 2). In the next row, spacing intervals of equal magnitude are provided, but are staggered from the first row such that pockets 16 of different flutes are spaced 120 degrees apart, compared to pockets 16 of those flutes spaced apart by 119, 120, and 121 degrees in the first row. The same principle is extended to succeeding rows of pockets 16. In the third row, spacing of flutes 24, 26, and 28 are 119.25 degrees, 120 degrees, and 120.75 degrees. In the fourth row, flute spacing is again 119 degrees, 120 degrees, and 121 degrees, but staggered from the arrangement of the first row. In the fifth row, flute spacing is 120.75 degrees, 120.75 degrees, and 118.5 degrees. Of course, other intervals may be substituted if desired.

VI ISSUES (37 C.F.R. § 1.192(c)(6))

1. Whether claims 1 - 10 are unpatentable under 35 U.S.C. 103(a) over Satran et al. in view of Lillie.

2. Whether claims 11 – 20 are unpatentable under 35 U.S.C. 103(a) over Satran et al. in view of Lillie.

VII GROUPING OF CLAIMS (37 C.F.R. § 1.192(c)(7))

Claims 1 - 20.

VIIIA ARGUMENTS—REJECTIONS UNDER 35 U.S.C. § 103 (37 C.F.R. § 1.192(c)(8)(iv))

Applicants respectfully submit that to establish a prima facie case of obviousness, three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the applied reference must teach or suggest all the claim limitations (See MPEP §2143).

It is respectfully submitted that the Office Action does not meet the criteria for establishing a prima facie case of obviousness. Neither Satran et al. nor Lillie individually or in combination teach all of the claimed limitations of the present invention.

The Examiner acknowledges that Satran et al. does not teach or suggest spacing the insert pockets at various angles and spacings. To overcome the deficiencies of Satran et al., the Examiner has cited Lillie.

The Examiner contends that Lillie teaches spacing insert pockets at various angles and spacings. Applicants respectfully disagree and submit that Lillie neither teaches or suggests the angular spacing of the cutting inserts within at least one row varies within the row as claimed by Applicants.

Lillie teaches, at column 5, lines 13-34, that the "relationships may be varied as deemed necessary and/or appropriate to adapt the concepts of the invention to other machining environments or applications." In regard to the relationships, it appears that Lillie is merely referencing the radial spacing of the inserts and axial and radial rake of the inserts. Lillie provides no teaching or suggestion to vary the angular spacing of the cutting inserts within at least one row as claimed. (Emphasis added).

For at least this reason, independent Claim 1, as well as Claims 2 - 10 which depend from Claim 1, are allowable over the applied art. Withdrawal of the rejection is respectfully requested.

In a similar manner, Claim 11 also describes that cutting inserts are arranged in at least a first row and a second row and at least three columns on the circumferential face, wherein the angular spacing of the cutting inserts within the first row varies within the first row, and the angular spacing of the cutting inserts within the second row varies within the second row and

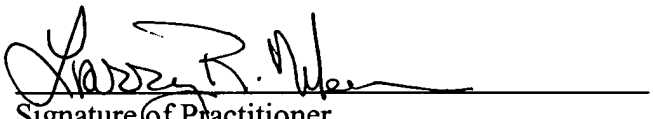
varies from the angular spacing of the cutting inserts within the first row. Neither Satran et al. nor Lillie, alone or in combination, teach or suggest the features of the invention as claimed in claims 11 – 20.

In view of the foregoing remarks, it is believed that the application is in condition for allowance. Accordingly, an early Notice Of Allowance is respectfully requested.

Conclusion

It is respectfully submitted that Claims 1 - 10 and 11 - 20 pending in the present application patentably distinguish over the combination of cited references in a manner consistent with 35 U.S.C. 103(a) and should be allowed.

Reversal of the Examiner's rejection and allowance of this patent application is therefore earnestly solicited.



Date: October 21, 2005
Reg. No.: 33,423
Tel. No.: 724-539-5485
Customer No.: 27877

Signature of Practitioner
Larry R. Meenan
Kennametal Inc
1600 Technology Way
Latrobe, PA 15650-0231

IX APPENDIX OF CLAIMS (37 C.F.R. § 1.192(c)(9))

The text of the claims involved in the appeal are:

1. A helical end mill comprising a body having a circumferential face bearing a plurality of pockets for receiving cutting inserts, wherein the cutting inserts are arranged in at least two rows and at least three columns on the circumferential face, wherein the angular spacing of the cutting inserts within at least one of the rows varies within the row.

2. The helical end mill according to claim 1, wherein at least one cutting insert is positioned at a first rake angle, and at least one other cutting insert is positioned at a different rake angle.

3. The helical end mill according to claim 2, wherein the first rake angle and the different rake angle both comprise axial rake angles.

4. The helical end mill according to claim 2, wherein the first rake angle and the different rake angle both comprise radial rake angles.

5. The helical end mill according to claim 4, wherein lead cutting inserts of different columns display radial rake angles of greater magnitudes than the rake angles of at least some other cutting inserts.

6. The helical end mill according to claim 4, wherein lead cutting inserts of different columns and cutting inserts immediately adjacent to the lead cutting inserts have similar radial rake angles; and lead cutting inserts of different columns and cutting inserts immediately adjacent to the lead cutting inserts each display radial rake angles of greater magnitudes than the rake angles of other cutting inserts.

7. The helical end mill according to claim 1, wherein the body has helical flutes disposed thereon, and each cutting insert is associated with one of the flutes.

8. The helical end mill according to claim 1, wherein each pocket is disposed to hold an installed insert such that the insert displays a clearance angle within the range of zero to twenty degrees.

9. The helical end mill according to claim 1, wherein at least one cutting insert is positioned at a first axial rake angle, and at least one other cutting insert is positioned at a different axial rake angle; and at least one cutting insert is positioned at a first radial rake angle, and at least one other cutting insert is positioned at a different radial rake angle.

10. The helical end mill according to claim 1, wherein at least one cutting insert is positioned at a first radial rake angle, and at least one other cutting insert is positioned at a different radial rake angle, and at least one cutting insert is positioned at a fist axial rake angle, and at least one other cutting insert is positioned at a different axial rake angle.

11. A helical end mill comprising a body having a circumferential face bearing a plurality of pockets for receiving cutting inserts, wherein the cutting inserts are arranged in at least a first row and a second row and at least three columns on the circumferential face, wherein the angular spacing of the cutting inserts within the first row varies within the first row, and the angular spacing of the cutting inserts within the second row varies within the second row and varies from the angular spacing of the cutting inserts within the first row.

12. The helical end mill according to claim 11, wherein at least one cutting insert is positioned at a first rake angle, and at least one other cutting insert is positioned at a different rake angle.

13. The helical end mill according to claim 12, wherein the first rake angle and the different rake angle both comprise axial rake angles.

14. The helical end mill according to claim 12, wherein the first rake angle and the different rake angle both comprise radial rake angles.

15. The helical end mill according to claim 14, wherein lead cutting inserts of different columns display radial rake angles of greater magnitude than the rake angles of at least some other cutting inserts.

16. The helical end mill according to claim 14, wherein lead cutting inserts of different columns and cutting inserts immediately adjacent to the lead cutting inserts have similar radial rake angles; and lead cutting inserts of different columns and cutting inserts immediately adjacent to the lead cutting inserts each display radial rake angles of greater magnitude than the rake angles of other cutting inserts.

17. The helical end mill according to claim 11, wherein the body has helical flutes disposed thereon, and each cutting insert is associated with one of the flutes.

18. The helical end mill according to claim 11, wherein each pocket is disposed to hold an insert such that the insert displays a clearance angle within the range of zero to twenty degrees.

19. The helical end mill according to claim 11, wherein at least one cutting insert is positioned at a first axial rake angle, and at least one other cutting insert is positioned at a different axial rake angle; and at least one cutting insert is positioned at a first radial rake angle, and at least one other cutting insert is positioned at a different radial rake angle.

20. The helical end mill according to claim 11, wherein at least one cutting insert is positioned at a first radial rake angle, and at least one other cutting insert is positioned at a different radial rake angle, and at least one cutting insert is positioned at a first axial rake angle, and at least one other cutting insert is positioned at a different axial rake angle.